THE DEVELOPMENT AND VALIDATION OF ADVENTURE-BASED MENTAL TOUGHNESS INVENTORY (AbMTI) FOR ADVENTURE-BASED PROGRAM IN MALAYSIA

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SULTAN IDRIS EDUCATION UNIVERSITY

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ABSTRACT

Since the turn of the 21st century, recent research has demonstrated that adventure-based programs are linked to positive psychological outcomes, including mental toughness. However, there are very limited studies conducted on how to design a specific instrument and model of the adventure-based mental toughness program. There are three primary objectives of study as follows: 1) determine whether there is a significant need to develop an Adventure-based Mental Toughness Inventory (AbMTI); 2) to validate the consensus on the development of AbMTI; and 3) to validate the AbMTI and Adventure-based Mental Toughness Model (AbMTM). The study is based on the modified Development and Design Research (DDR). There were total of 507 participants in the study who participated in an adventure-based programs. The statistical tools IBM Statistics (SPSS) and Structural Equation Modelling (SEM) were used as the primary statistical tools in this study. The findings of the study significantly validated the development of AbMTI and AbMTM. The study provides a foundation on which to build coherent and systematic scholarly work to linked adventure-based program and mental toughness. The study findings, methodology, the conceptual model, and the set of discussion can guide subsequent research.

Keywords: *Adventure-based program, mental toughness, instrument*

PEMBINAAN DAN KESAHAN *ADVENTURE-BASED MENTAL TOUGHNESS INVENTORI (ABMTI)* BAGI PROGRAM BERASASKAN REKREASI LUAR DI MALAYSIA

ABSTRAK

Seiring anjakan abad ke-21, terdapat banyak kajian-kajian terkini yang telah menunjukkan bahawa program-program berasaskan rekreasi luar *(adventure-based program)* dikaitkan dengan kesan positif terhadap pembinaan aspek psikologi, termasuklah ketahanan mental. Namun, terdapat kajian yang terhad telah dijalankan bagi merekabentuk instrumen penilaian dan model ketahanan mental berasaskan rekreasi luar. Terdapat tiga objektif utama dalam kajian ini, iaitu; 1) mengenal pasti adakah terdapat keperluan yang signifikan bagi pembinaan *Adventure-based Mental Toughness Inventory (AbMTI*); 2) untuk kesahan konsesus bagi pembinaan AbMTI, dan 3) kesahan bagi AbMTI dan Adventure-based Mental Toughness Model (AbMTM). Kajian ini berpandukan *modified Development and Design Research*. Kajian ini melibatkan seramai 507 peserta yang telah menyertai program berasaskan rekreasi luar. *IBM Statistics (SPSS)* dan *Structural Equation Modelling (SEM)* digunakan sebagai perisian analisis utama dalam kajian ini. Dapatan utama kajian ini mendapati bahawa validasi AbMTI dan AbMTM telah mencapai nilai kesahan yang sangat signifikan. Kajian ini telah menyediakan satu platform untuk mengukuhkan kajian ilmiah yang tepat dan sistematik untuk mengaitkan program rekreasi luar dan ketahanan mental. Dapatan kajian, metodologi, rekabentuk kajian, model konseptual dan perbicangan dari kajian ini boleh dijadikan panduan bagi kajian akan datang.

Kata kunci: Program berasaskan rekreasi luar, ketahanan mental, instrumen

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ABBREVIATION

AbMTI	Adventure-based Mental Toughness Inventory
AbMTM	Adventure-based Mental Toughness Model
UiTM	Universiti Teknologi MARA
UPSI	Universiti Pendidikan Sultan Idris
KBS	Kementerian Belia dan Sukan
ISN	Institut Sukan Negara
SEM	Structural Equation Modelling
MI	Modification Indices
AVE	Average Variance Expected
GoF	Goodness of Fit
KMO	Kaiser Meyer Olkin test
MCO	Movement Control Order
PJRM	Persatuan Jurulatih Rekreasi Malaysia

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

People from all over the world engage in adventure-based programs for a variety of reasons. Developing mental toughness is one of the emerging goals. Numerous studies have discovered a possible link between the intervention of adventure-based programs and the development of psychological characteristics, such as mental toughness. Nordbo and Prebensen (2015) assert that participation in an adventure-based program significantly improved participants' mental toughness. Clough, MacKenzie, Mallabon, and Brymer (2016) concur with this statement, believing that well-designed adventure-based programs can have a significant impact on the development of mental toughness. The researcher also argues that adventure-based programs are often associated with the development of mental toughness. Given these facts, it's unsurprising that adventure-based programs have emerged as a means of fostering mental toughness development.

This scenario is also reflected in Malaysia's implementation of adventure-based programs. According to Shafie and Che Mat (2014), numerous adventure-based programs are being implemented in Malaysia at various levels of organization, including local sports bodies, educational institutions, government agencies, and commercial outdoor consultants or operators, with the goal of enhancing mental toughness. This means that local practitioners share a strong belief, without exception, in the importance of developing mental toughness as a goal of adventure-based programs. However, it is clear that a specific instrument and model of adventure-based mental toughness are difficult to come by.

1.2 Adventure-based Program

Adventure-based programmes are frequently associated with an open natural environment, challenging activities, and a desire for sensations, and their completion requires one's skills. Adventure-based programmes, according to Ewert and Sibthorp (2014), are defined as an experience involving exciting events that include elements of challenge, danger, and as well as elements of risk. Many researchers believe that the inclusion of all these elements in adventure-based programmes contributes to the development of an individual's physical, emotional, social, and psychological aspects (Mackenzie, Son & Eitel, 2018; Davidson, 2016; Mutz & Muller, 2016; Lekies, Yost, & Rode, 2015; Nordbo & Prebensen, 2015; Wang, Liu, & Kahlid, 2006). The researcher found that adventure-based is also often associated with the development of mental toughness.

With a particular emphasis on the psychological aspects of mental toughness, adventure-based programs were also found to have a positive effect on several common mental toughness constructs such as confidence, motivation, coping skills, focus, challenge, control, and commitment (Nordbo & Prebensen, 2015; MacKenzie, Son, & Eitel, 2018; Muz & Muller, 2016; Lekies, Yost, & Rode, 2015; Crust & Allen-Collison, 2016). While these findings are similar, there has been a paucity of research specifically focused on the development of adventure-based mental toughness instruments and models, despite the similarities between the findings. Consequently, the effectiveness of outdoor adventure programmes in terms of participants' mental toughness development is still being researched and tested.

1.3 Mental Toughness

On the other hand, mental toughness originates from the perspective of elite sport since it was introduced. A sport psychologist, Loehr (1982) is known as one of the foremost researchers on mental toughness. Even today, the concepts of mental toughness introduced by Loehr are still being debated and discussed. As proposed by Bell, Hardy and Beattie (2013), mental toughness can be referred to as a multi-dimensional construct comprising values, attitudes, emotions, and cognitions that enable people to successfully pursue their goals and perform consistently well regardless of obstacles or adversity. In sporting perspective, mental toughness is established as a superior mental quality of an athlete, and it has become one of the important psychological aspects in sports performance (Coulter, Mallett, & Gucciardi, 2010).

As a result, mental toughness has grown in popularity as a subject of study. Most of the research on mental toughness has been conducted in sports settings, with a particular emphasis on general sports, specific sports, individual sports, and team sports. As a result, at least seven (7) common instrumentations for assessing mental toughness in sporting contexts have been developed and validated.

The instrumentations are as follows: (1) Psychological Performance Inventory-PPI (Loehr, 1986), (2) Mental Toughness Questionnaire-MTQ48 (Clough, 2002), (3) Psychological Performance Inventory-A (Golby, Sheard, & Van Wersch, 2007), (4) Mental, Emotional, and Physical Toughness Inventory (Mack & Ragan, 2008), (5) Cricket Mental Toughness Inventory (Gucciardi & Gordon, 2009), (6) Sports Mental Toughness Questionnaire (Golby, Sheard, Gordon & Dimmock, 2009), (2) and (7) Australian Football Mental Toughness Inventory (Gucciardi, Gordon & Dimmock, 2009a). However, to the best of the researcher's knowledge, there is no instrumentation that has been developed specifically for use in adventure-based settings.

1.4 Problem Statement

According to the Institute for Youth Research of Malaysia (IYRES) in 2017, it has been reported that 59.8 percent of Malaysian youth participate actively in adventure recreation, which includes adventure-based mental toughness programs. These statistics demonstrate that adventure-based programs with a focus on mental toughness development have become a source of concern among outdoor recreation practitioners

in Malaysia (Shafie & Che Mat, 2014). However, the question of how this mental toughness is measured in an adventure-based setting becomes a point of contention in the process. Along with these problems are also issues related to models for the development of mental toughness in adventure-based settings.

Additionally, it is unknown to what extent these measurement instruments and models are required by Malaysian outdoor practitioners. According to accepted practice, an adventure-based program that includes mental toughness development as a goal does not measure or accurately measures the level of mental toughness among the participants (Davidson, 2016; Shafie, Che Mat, & Md Taff, 2015). Similarly, Rowley (2014) emphasizes the importance of having the appropriate instruments when conducting a study in order to maximize the achievement of the study's objectives. Without addressing this issue, the debate over the effectiveness of adventure-based programs in the development of mental toughness will continue to rage.

There is no doubt that a variety of mental toughness instruments have been extensively used in previous research. However, obtaining an instrument that is purpose-built and guided by an adventure-based setting is difficult (Nordbo & Prebensen, 2015; Crust & Allen-Collison, 2016). It is obvious that most established instruments are designed with a sporting perspective. As a result, several components of established instruments are significantly underrepresented when used in adventure-based program settings. There is a void in which numerous items from established instruments are significantly irrelevant, such as the influence of fan distraction (PPI: Loehr, 1986), opponent pressure (PPI-A: Golby et al., 2007), and competition pressure (CMTI: Gucciardi & Gordon, 2009; SMTQ: Sheard et al., 2009), and significantly too

general (CMTI: Gucciardi & Gordon, 2009). (MTQ48; Clough, 2002). Even though these instruments are available, none provide specific estimates for environmental challenges (open weather conditions, wilderness, discomfort zone) and risks associated with adventure-based programs. Therefore, the tests' accuracy can be questioned as it was applied a sport's context instruments in adventure-based settings.

The fact is most utilized mental toughness' constructs are developed based on sport's competition and athletes' performance contexts (Perry, Clough, Crust, Earle, & Nicholls, 2013). In addition, several constructs from utilized models such as visualization and imagery control (Loehr, 1986; Golby et al., 2007); future potential (Middleton, Marsh, Martin, Richards, & Perry, 2004); sports intelligence (Connole, 2009; Guciardi & Gordon, 2009) and competition's behavior (Guciardi & Gordon, 2009) are based on competition influences. These constructs are seen as irrelevant hence the nature of adventure-based programs is generally less stressed on competitive elements (Virden, 2006). This gap possibly contributes to misconception in designing appropriate programs.

In a single year, millions of dollars were spent on adventure-based program implementation. These claims are based on current practices of adventure-based programs that have been widely implemented in Malaysia, involving many levels of organizations such as schools, universities, youth councils, sports bodies, private companies, government agencies, and recreation consultants. According to Md Taff (2020), outdoor recreation industry generates hefty economic return, and adventure-

based programs (outdoor education and outdoor recreation) account for 2.5 percent of total Malaysian tourism revenue. There is debate about whether investing in adventure-based mental toughness programs is worthwhile. Hence it has been questioned, it is a call to invent a specific tool to assess mental toughness in adventure-based setting. Despite their dubious effectiveness, high costs are still allocated and channeled to fund the programs to this day.

From another angle, studies regarding adventure-based program and mental toughness conducted on the narrow scope (Clough et al., 2016; Perry et al., 2013). There is very limited knowledge relating to adventure-based programs and mental toughness. Based on literature, previous studies on adventure-based programs are traditionally focusing on several common psychological aspects. On the other hand, most mental toughness studies are conducted based on conceptualizing mental toughness in sports context. As a result, how adventure-based programs influence an individual's mental toughness are constantly debated. The outdoor adventure practitioners have limited information and knowledge in designing effective adventure-based programs with the purpose to improve mental toughness.

To summarize, there are gaps between adventure-based programs and mental toughness, which include: 1) a lack of information regarding the need for an adventure-based mental toughness inventory and model; 2) a lack of a specific instrument to assess mental toughness in an adventure-based setting; 3) a lack of a specific model; 4) the worthiness of implementation costs; and 5) a lack of studies regarding adventure-based programs and mental toughness. Despite widespread belief that adventure-based

programs are associated with the development of mental toughness, there is currently insufficient evidence to support this claim. It is a call now to develop and invent solutions for adventure-based mental toughness's instrument and model.

1.5 Significant of the Study

This study significantly becomes the first to provide important data to identify the need to develop mental toughness instruments and models for adventure-based programs in Malaysia. Issues related to the extent to which local active practitioners need this instrument and model are answered based on facts guided by systematic and comprehensive analysis. The findings of this study are also the determinants and direction of the development of adventure-based programs in Malaysia. It also directly reveals current issues related to the implementation of adventure-based programs in Malaysia.

It should also be noted, this is the first attempt in Malaysia's recreational field to develop a specific instrument to assess mental toughness in adventure-based program setting. With the acknowledgement to the several previous studies on mental toughness instrument development (Loehr, 1986; Clough et al., 2013; Golby, Sheard & Van Wersch, 2007; Mack & Ragan, 2008; Gucciardi & Gordon, 2009; Gucciardi, Gordon & Dimmock, 2009a), this study focuses on the conjunction between intervention of adventure-based program and mental toughness. Issue on the accuracy of the tests be

eliminated. Through the development and validation processes, the irrelevant and unrepresentative items of the developed instrument were minimized. Importantly, this study also verified the effectiveness of adventure-based programs in improving mental toughness.

Particularly, this study also serves another contribution by developing a model of adventure-based mental toughness model. Despites several studies related with mental toughness was conducted by local researchers (Shafie & Che Mat, 2014; Anizu, Kumaraswamy, Singh & Rusli, 2003; Kuan & Roy, 2007; Mohamad, Omar-Fauzee, & Abu, 2009; Omar-Fauzee,, Saputra, Samad, , Gheimi, Asmuni, & Johar, 2012), but none are conducted specifically in focus of adventure-based mental toughness model development. Without a doubt, this study can be claimed as integral. The findings of this study eliminate the debates regarding the best constructs in designing adventure-based programs with aims to develop mental toughness. Through the processes, this study also minimizes misconception in designing appropriate adventure-based programs. Indeed, the developed model being a standard guideline, especially for outdoor adventure practitioners in designing the programs.

This study significantly contributes to providing evidence on the worthiness of the budget allocation for the intervention of adventure-based programs in enhancing mental toughness. The developed instrument and model contribute to verify the effectiveness of the program. Also, this study provides a guideline in designing a cost-effective adventure-based program with aims to enhance mental toughness. Through

the processes, this study eliminates irrelevant and misconception in designing the programs that escalate the budget. Indeed, this study is crucial as to clarify the effective cost in designing an adventure-based program.

Considering all of these significant breakthroughs, it can be considered as the new horizons in recreational studies. To foster a deeper understanding of the problems, the current knowledge in the study area is expanded. Moreover, the adventure-based program and mental toughness are no longer being studied in the narrow scope. A question on how adventure-based programs affect positively towards an individual's mental toughness can be answered.

As a result, outdoor recreation practitioners eventually will be assisted by this study for their work. The findings from the study were utilized as guidance to design and evaluate the impact of adventure-based programs with the objective to improve participants' mental toughness. All the information gathered is used to help determine the most important aspects of the adventure-based mental toughness program design.

1.6 Purpose of the Study

There are three main objectives for this study. These objectives are based on the focus of the study and the framework for the development of Adventure-based Mental Toughness Inventory (AbMTI) and Adventure-based Mental Toughness Model (AbMTM). The objectives are as follow.

1.6.1: To identify the need to develop AbMTI

1.6.1.1 To identify the percentage of agrees

1.6.1.2 To identify the level of consensus

1.6.2: To determine the consensus on the development of AbMTI

1.6.2.1 To identify the items and constructs development consensus

1.6.2.2 To identify the content validity

1.6.3: To validate the AbMTI using SEM.

1.6.3.1 To identify the items and constructs validity of EFA-CFA

1.6.3.2 To validate the reliability and validity of AbMTI

1.6.3.3 To validate goodness of fit of AbMTM

1.7 Research Questions

The research questions that answered through this study are:

1.7.1 Is there any significant need to develop AbMTI?

1.7.1.1 What is the percentage of agrees score?

1.7.1.2 What is the level of consensus?

1.7.2 What are the consensus score of the development of AbMTI?

1.7.2.1 What is the consensus score for the items and constructs?

1.7.2.2 What is the content validity score?

1.7.3 What are the validity score of the AbMTI?

1.7.3.1 What is the items and constructs validity of EFA-CFA?

1.7.3.2 What is the reliability and validity of AbMTI?

1.7.3.3 What is the goodness of fit of AbMTM?

To answer the research questions, this study employed the modified Development and Design Research (Siraj, Abdullah, & Rozkee, 2020) as a research design and Structural Equation Modelling (SEM) as the statistical tools of validation. This design is considerably the most suited research design to answer the research question and objectives. The researcher believed modified DDR as an approach to have a better understanding of the research problem and process to solve it. Overall, this approach is supported by statistical analysis procedures. Two main analysis tools applied to this study are IBM SPSS and SEM.

1.8 Study Limitations

1.8.1 Methodology

This study focuses on the development of the instruments and model based on structured questionnaires. Though every effort was made to ensure respondents give true and honest responses, the validity of their views cannot be established. It was difficult to find out whether each of the participants was able to articulate their feelings honestly and accurately. To minimize the effect, the researcher explains and request the respondents to answer the questionnaire as accurately and truthfully as possible.

1.8.2 Setting: Adventure-based program

This study focuses among adventure-based program participants as respondents. There are a variety of adventure-based program implementations with the purpose to develop mental toughness. To minimize the effect, the researcher be focused on only several adventure-based program venues and identify the same duration of program. They assumed to experience the same setting and challenges.

1.8.3 Previous adventure-based program experiences and knowledge

The previous outdoor adventure experiences and knowledge of the respondents were beyond the researcher's scope. The researcher asks respondents to include information about their adventure-based program experience in the demographics profile section. This action assists the researcher identify the demographics background of the respondents.

1.9 Definition of Terms

1.9.1 Adventure-based program

Adventure-based programs refer to any form of outdoor recreational activities that expose participants to outdoor environments, open weather, and challenging activities. The implementation of this program has an impact on the development of psychological aspects, including mental toughness. The idea parallel with Mackenzie, Son, and Eitel (2018) claim adventure-based program influences on the individual physical and psychological positives effects, including mental toughness after experiences or engages in an adventure activity, which has varying degrees of difficulty, uncertainty, challenge, and risks.

1.9.2 Mental toughness

Mental toughness is defined as the level of persistency of an individual to absorb pressure from the external environment such as open weather and the challenging activity when involved in an adventure-based program. The idea in line with Martin et al. (2004a) when they refer mental toughness as the consistency or persistency to achieve the goal despite in the tough, pressure or difficult situation. Mental toughness found to be influenced by several psychological constructs such as self-confidence, motivation, coping skills, focus, challenge, control, and commitment.

1.9.3 Self-confidence

In this study, self-confidence referred as the way individual trusting in their own judgment, capacities, and abilities when facing difficulties or challenges during participated in adventure-based program. It is also referred to the way an individual accepts strengths, weakness and have a positive view of it. Self-confidence also known as one of the integral factors of mental toughness (Crust & Swann, 2011).

1.9.4 Motivation

Motivation referred as the process that initiates, guides, and maintains goal-oriented behaviours despite facing challenges, difficulties, or risk during participation in adventure-based program. It is generally defined as what causes individuals to act. According to Nicholls, Perry, Jones, Sanctuary, Carson, and Clough (2015) motivation is also listed among the factors that are often to be linked with mental toughness. The participation in adventure-based program able to foster individual's motivation.

1.9.5 Coping Skills

Coping Skill referred as the ability of an individual to deal with hardiness, challenging, and difficult situations in adventure-based program setting. An individual ability to face a situation, act, and be flexible and persistent in solving the challenges. As an example, studies by Joshi and Kalode (2019) highlighted the ability to cope physically and mentally pressure leads to mental toughness.

1.9.6 Focus

Focus referred as the thinking skill that allows individual to begin a task without procrastination and then maintain their attention and effort until the task is complete in adventure-based program setting. The nature of adventure-based program exposes participants to challenging and difficulties due to uncontrollable factors such as weather, wildlife, and the natural environment. Focus helps individual pay attention during distractions and setbacks to reach a goal. Focus becomes one of the key factors to overcome that difficulty or challenge (Lanaj, Chang, & Johnson, 2012).

1.9.7 Challenge

Challenge referred as an individual's risk-taking behaviour to take an invitation or a call to action in adventure-based program setting. Challenges in adventure-based program is vary in scope and complexity. An individual's desire to face challenges and risks reflects mental toughness. Clough and Strycharczyk, (2012) also emphasize that risk taking and tough attitude in the face of challenges explained the element of perseverance or tough character.

1.9.8 Control

Control referred as the ability to control behaviours to avoid temptations and to achieve goals during participation in adventure-based program. It also can be referred as the ability to resist unwanted behaviours or urges. According to St Clair-Thompson, Bugler, Robinson, Clough, McGeown, and Perry (2015) control is stated as an integral important aspect of mental toughness. A mentally tough individual able to regain psychological control following unexpected events.

1.9.9 Commitment

In this study, Commitment is referred as the act of individual binding themselves to a course of action in adventure-based program setting. Despite challenging and difficult situation, the individual remains committed to achieve the goals. Crust and Swann (2011) stated mental toughness appear when an individual remains committed and maintain it in overcoming the difficulties or adversity.

1.9.10 Validation

Validity in instrument development relates to the extent at which the item measures right elements that need to be measured. In simple terms, validity refers to how well an instrument as measures what it is intended to measure. Reliability alone is not enough, measures need to be reliable, as well as, valid. Validation can be tested by Structural Equation Modelling (SEM), throughout several analyses such as Cronbach Alpha (CA), construct reliability (CR), average variance extracted (AVE).

1.9.11 Goodness of Fit

The term goodness-of-fit refers to a statistical test that determines how well sample data fits a distribution from a population with a normal distribution. Generally, it shown whether a sample is skewed or represents the data you would expect to find in the actual population. Goodness of Fit can be tested by Structural Equation Modelling (SEM), throughout analysis such as calculate a chi-square statistic.

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